MarKeting Lec (6) 5/11/2016

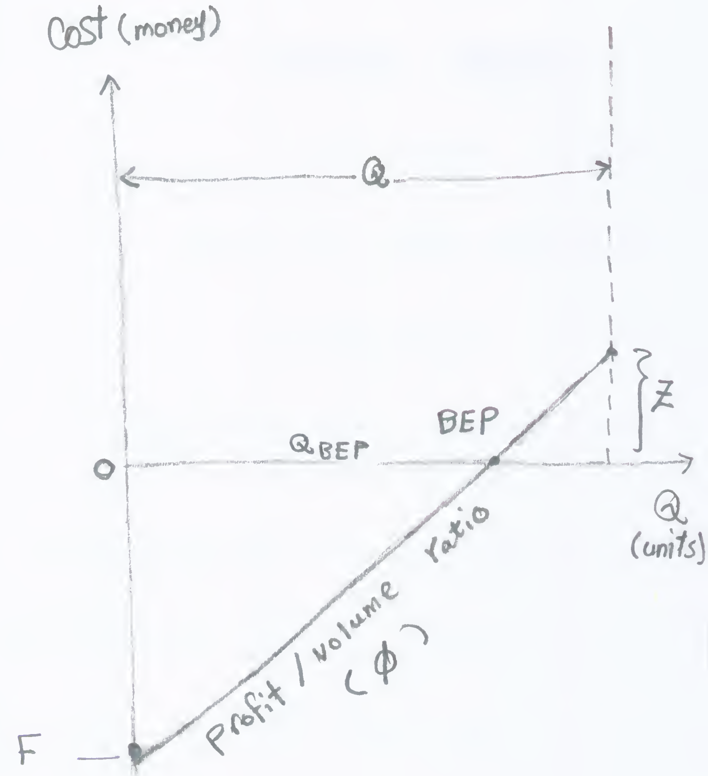
* Profit - volume chart

Given : Z (Profit)

Q (volume)

F (Fixed Cost)

$$\phi = \frac{F}{Q_{BEP}} = \frac{F+Z}{Q}$$

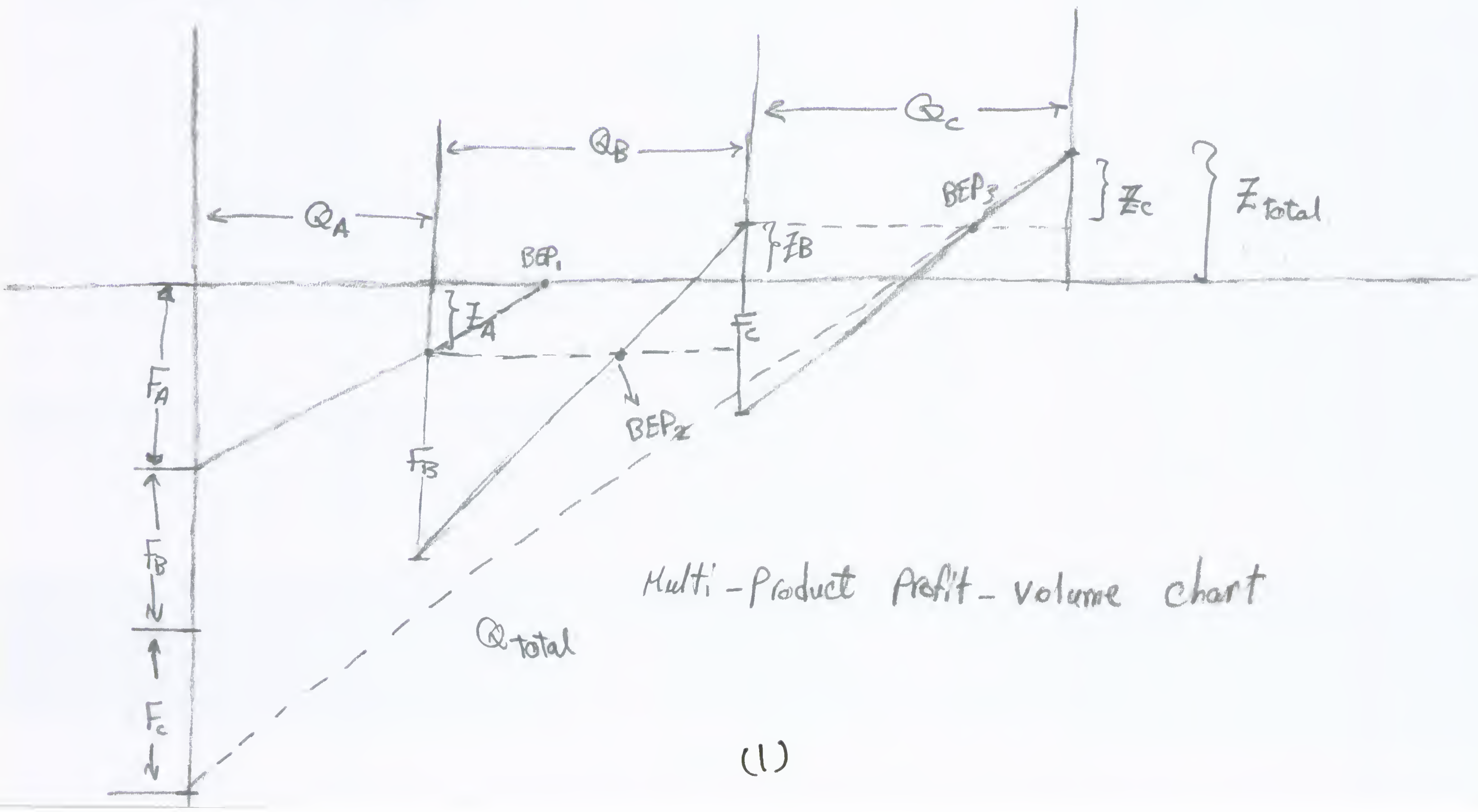


- Multi - products profit / volume chart :

$A \longrightarrow Q_A , F_A , Z_A$

$B \longrightarrow Q_B , F_B , Z_B$

$C \longrightarrow Q_C , F_C , Z_C$



Multi - Product Profit - volume chart

Minimum Cost analysis :
(Quentities in Batch Production)

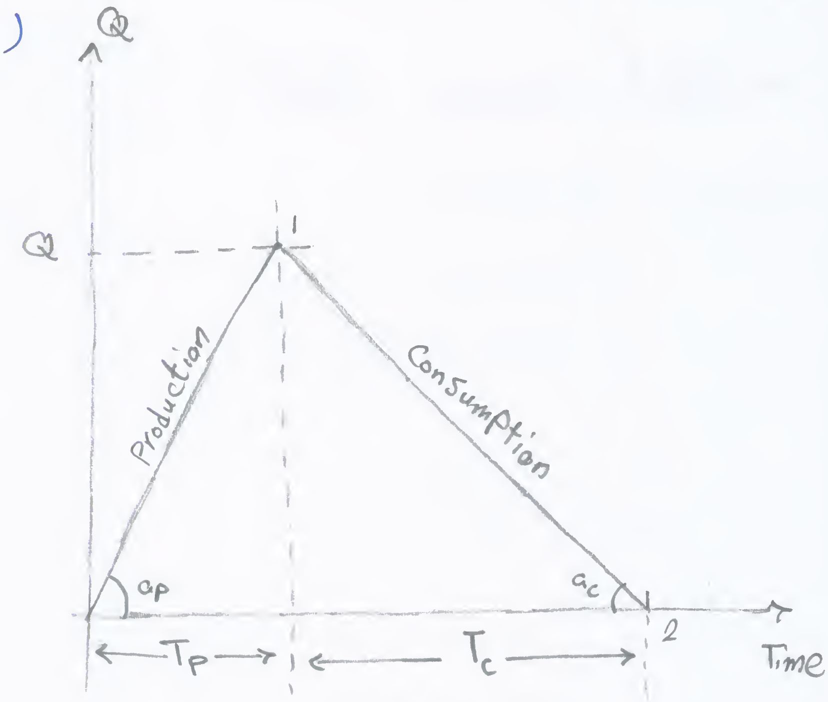
- stock Control :

0 : 1 Production

production rate = $\tan^{-1}(a_p)$

1 : 2 Consumption

consumption rate = $\tan^{-1}(a_c)$



Stock Control

$\therefore Q = a_p * T_p \longrightarrow$ for production

$= a_c * T_c \longrightarrow$ for consumption

$T_p \cdot a_p = T_c \cdot a_c \Rightarrow \frac{T_p}{T_c} = \frac{a_c}{a_p} = \gamma$ (measure of spent time for one prod. cycle)

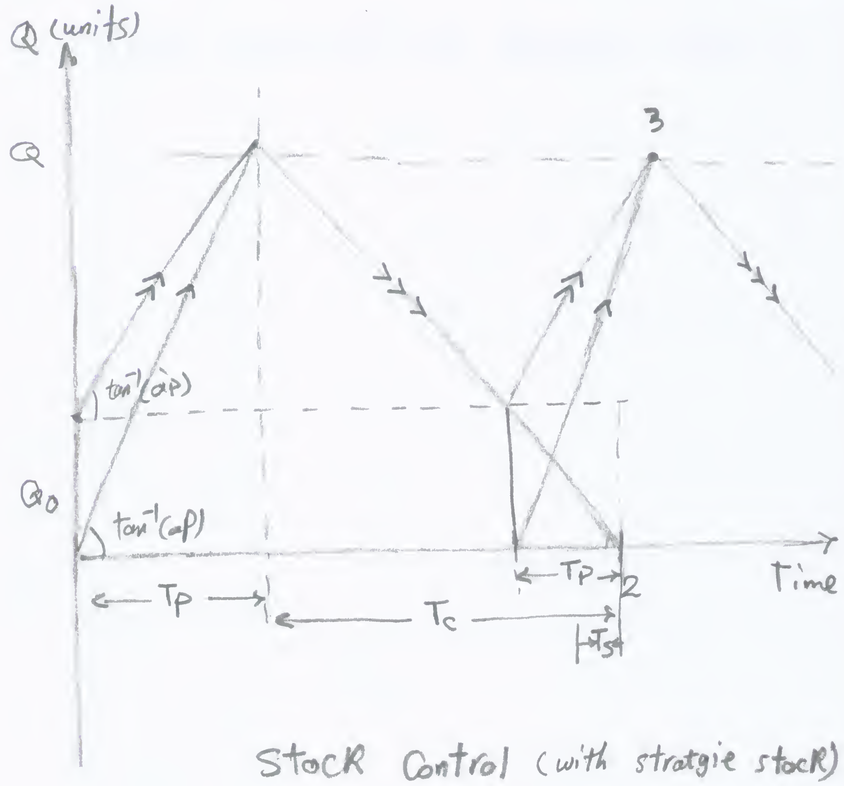
If $\gamma = 1 \Longrightarrow a_p = a_c$

$= 0 \Longrightarrow$ no time

$T = T_c - T_p - t_s$

$= T_c\left(1 - \frac{T_p}{T_c}\right) - t_s$

$t = T_c(1-\gamma) - t_s$



Stock Control (with stratgie stock)

Minimum-Cost Batch size:

* Batch-size $\xrightarrow{\text{at}}$ Minimum cost

* what are the factors affecting the selection of Batch size?
  - set-up Cost
  - Consumption rate
  - Production rate
  - Interest charges per piece per unit time
  - Average storge costs
  - Sale price

* The following four criteria:
  - Min. Costs / piece
  - " Profit for the Batch
  - Max ratio of profit to Prod. Costs
  - Max rate of return / unit time.

* The production costs per piece consist mainly of four factors:
  - Constant cost per piece: $C = m + o + l$
    - l → labor cost / piece
    - o → over-head cost / piece
    - m → material cost / piece
  - Preparation costs per piece (setting-up): $\dfrac{S}{Q}$
  - Interest carrying costs: $I = i \cdot c$ → constant costs
    - i → interest rate

Interest carrying cost / piece / unit time $= \dfrac{i}{2a_c}(Q + Q_o)$

For average quantity $= Q_{avg} = Q_m = \dfrac{Q + Q_o}{2}$

$$I = i \cdot Q_{avg} \cdot T_c = I \, \frac{Q + Q_o}{2} \cdot \frac{Q}{a_c}$$

- Storage Carrying Cost / Piece / unit time $= B\, T_c$

$$= B \cdot \frac{Q}{ac}$$

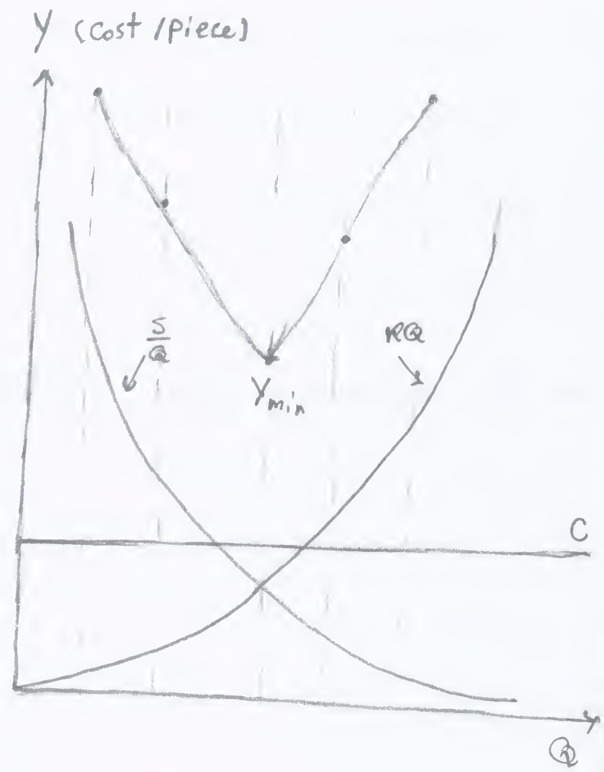
- Production Cost / Piece

$$Y = C + \frac{S}{Q} + \frac{QI}{2ac}(1+\gamma) + 2B\frac{Q}{2ac}$$

$$= C + \frac{S}{Q} + \frac{Q}{2ac}[I(1+\gamma) + 2B]$$

where $R = \frac{1}{2ac}[I(1+\gamma)+2B]$

$$Y = C + \frac{S}{Q} + RQ$$



at min cost / piece : $\frac{dY}{dQ} = 0$

$$\frac{dY}{dQ} = 0 = 0 - \frac{S}{Q^2} + R$$

$$\frac{S}{Q^2} = R \Rightarrow Q_m^2 = \frac{S}{R}$$

$$Q_m = \sqrt{\frac{S}{R}} \longrightarrow \frac{S}{Q_m} = RQ_m$$

$$Y_m = C + \frac{S}{Q_m} + RQ_m$$

$$= C + \frac{2S}{Q_m}$$

$$= C + 2RQ_m$$